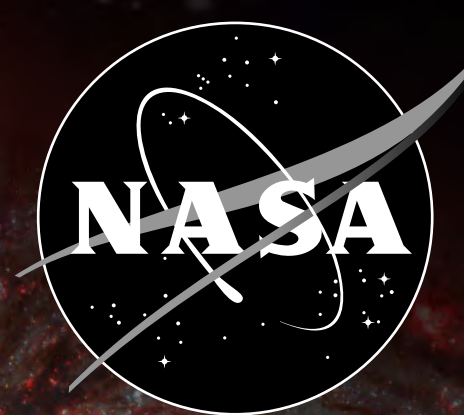


National Aeronautics and Space Administration



Human Spaceflight

Space Science Missions

TDRS

NASA's Tracking and Data Relay Satellites (TDRS) provide a multitude of communication services to a wide variety of missions, studying everything from our own ever-changing Earth to the deepest depths of space; from exploring our Sun to supporting human spaceflight endeavors. Each mission TDRS works with brings back its own unique data, providing the world with a glimpse of the scientific information NASA produces on a daily basis. Simply stated, TDRS enables science.

Earth Science Missions

Launch Vehicles



TDRS

TRACKING AND DATA RELAY SATELLITE
ENABLING MISSION SUCCESS

TDRS supports human spaceflight missions bringing mankind to new frontiers above Earth's atmosphere and beyond. Over the past half century, NASA, in cooperation with other international agencies, has been sending humans into space, allowing for the build of the space station, the repair of satellites, and even landing on the moon. These journeys provide a unique opportunity to gather data first hand, as well as learn about the physical rigors of space. TDRS enabled human spaceflight missions are paving the way for the next generation of exploration and discovery.

Depicted above is an image of the International Space Station and the docked space Shuttle Endeavour, flying at an altitude of approximately 220 miles. The image was taken by Expedition 27 crew member Paolo Nespoli from the Soyuz TMA-20 following its undocking on May 23, 2011 (USA time).

Credit: NASA, Paolo Nespoli

TDRS supports space science missions that investigate the farthest reaches of space. These missions catalog events such as gamma ray bursts, stellar black holes, the birth of galaxies, and the early history of our universe. Through them, we learn new information about the scope and scale of the cosmos.

Depicted above is an image of the nebula M1-67 around Star Wolf-Rayet124 taken by the Hubble Space Telescope. The Wolf-Rayet star is an extremely rare and short-lived class of super-hot star (in this case 5,000 degrees Kelvin.) In the above image, the star is going through a violent, transitional phase and is surrounded by hot clumps of gas that are being ejected into space at speeds of up to 100,000 miles per hour! This star is located in the constellation of Sagittarius and is 15,000 light-years away.

Credit: NASA, Yves Grosdidier (Univ. of Montreal), Anthony Moffat (Univ. of Montreal), Gilles Joncas (Univerte Laval), and Agnes Acker (Observatoire de Strasbourg).

Tracking and Data Relay Satellites are key enablers of the missions listed below. They provide the critical communications link that connects a user on the ground to a satellite in space. To further explore the different missions TDRS provide services to, use your smart phone to scan the Quick Response (QR) Codes below. The QR Codes will take you to each mission's website, showing you just how much data the TDRS constellation moves and the great science it enables.

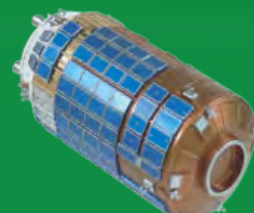
ATV-3 - Automated Transfer Vehicle



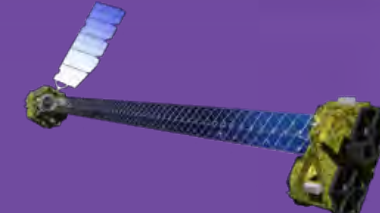
ISS - International Space Station



HTV-3 - H-II Transfer Vehicle 3



NuStar - Nuclear Spectroscopic Telescope Array



MMS - Magnetospheric MultiScale



Space-X/COTS Demo C2 - Falcon 9 Launch Vehicle and Dragon Cargo Capsule



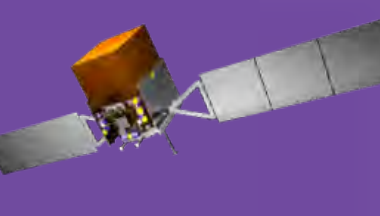
OSC/Cygnus - Orbital Science Corporation Cygnus



Balloons - Balloon Project (BP), Long Duration Balloon (LDB), Ultra Long Duration Balloon (ULDB)



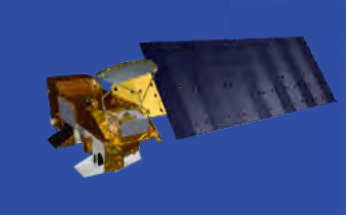
FGST - Fermi Gamma-ray Space Telescope



C/NOFS - Communications/Navigation Outage Forecasting System



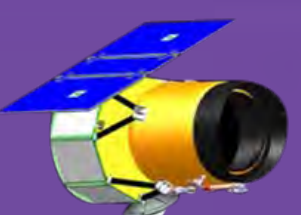
AQUA - Earth Observing System (EOS) PM-1



AIM - Aeronomy of Ice in the Mesosphere



WISE - Wide-field Infrared Survey Explorer



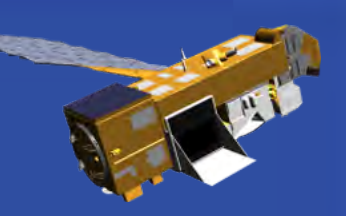
SCaN Testbed/ConnECT - Space Communications and Navigation Testbed



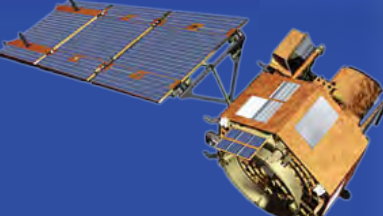
RBSP - Radiation Belt Storm Probes



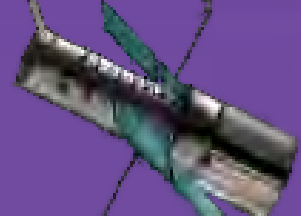
AURA - Earth Observing System (EOS) CH-1



EO-1 - Earth Orbiter-1



HST - Hubble Space Telescope



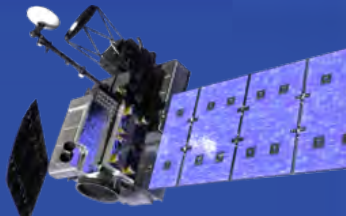
GALEX - Galaxy Evolution Explorer



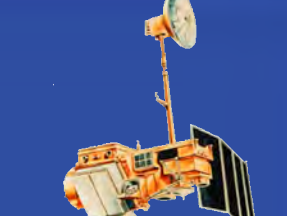
Swift - Gamma-ray Burst Observer



GPM - Global Precipitation Measurement



Landsat-5



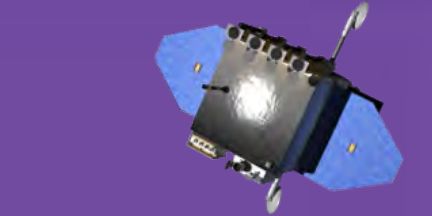
Landsat-7



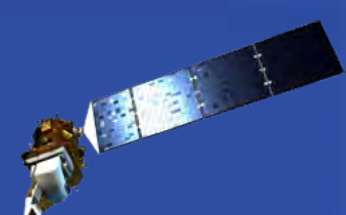
THEMIS - Time History of Events and Macroscale Interactions during Substorms



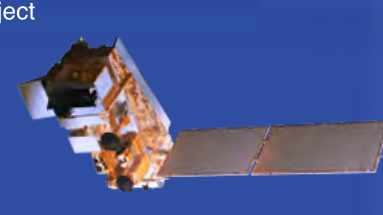
SDO - Solar Dynamics Observatory



LDCM - Landsat Data Continuity Mission



NPP - National Polar-orbiting Operational Environmental Satellite System Preparatory Project



OCO-2 - Orbiting Carbon Observatory-2



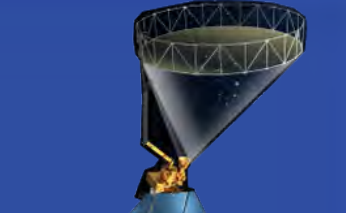
SORCE - Solar Radiation and Climate Experiment



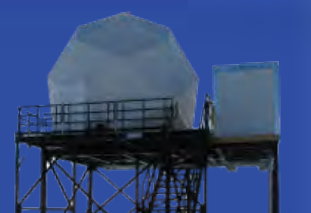
TIMED - Thermosphere, Ionosphere, Mesosphere Energetics and Dynamics



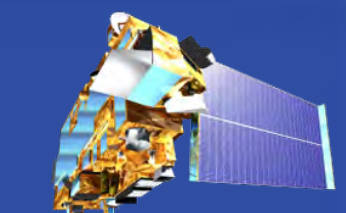
SMAP - Soil Moisture Active Passive



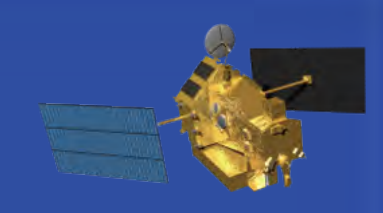
SPTR - South Pole TDRSS Relay



TERRA - Earth Observing System (EOS) AM-1 Flagship



TRMM - Tropical Rainforest Measuring Mission



Minotaur IV



Atlas V



Delta II



Delta IV



Sea Launch



TDRS supports Earth science missions that explore Earth events and processes vital to human civilization. In order to study the planet as a whole system and understand how it is changing, NASA develops a large number of these missions. Together they offer Earth science researchers the necessary data to address key questions about global climate change and the future of the Earth system.

Depicted below is an image captured by the Visible/Infrared Imager Radiometer Suite or VIIRS instrument aboard the Suomi National Polar-orbiting Project (NPP) satellite.

Credit: NASA/NOAA/GSFC/Suomi NPP/VIIRS/Norman Kuring

TDRS provides a variety of support services to the launch vehicles NASA uses to send missions into space. NASA works with other international agencies and commercial partners to explore space. In order to ensure that the launch vehicle is on the correct trajectory or path, TDRS tracks its movement after launch and provides real-time data to the launch and mission personnel. This essential service allows for mission personnel to follow their mission as it exits Earth's atmosphere and enters into its orbit in space.

The image below shows five launch vehicles used by NASA to send their spacecraft into space. From Left to Right: Orbital Science's Minotaur IV Rocket; United Launch Alliance's Atlas V; United Launch Alliance's Delta II rocket; United Launch Alliance's Delta IV rocket; and Sea Launch's Zenit 3SL Rocket.

Credit: United Launch Alliance, Orbital Science, Sea Launch and NASA

National Aeronautics and Space Administration

Tracking and Data Relay Satellite Project

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